

Master Project (30 ECTS)

Administrative

Supervision: Cedric Frantz, Prof. J. Van Herle

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Location: Sion (presential, travel allowance offered)

Remarks: If interested, please send your CV, with a short motivation letter, to cedric.frantz@epfl.ch and jan.vanherle@epfl.ch.

Project description:

The Group of Energy Materials is looking for a highly motivated Master student to commission and test a new bio-electrolysis stack. The stack consists of six microbial electrolysis cells that enable the conversion of carbonaceous wastes into high value products (e.g., methane, acetate). A bio-electrical system (BES) consists of at least two electrodes, a cathode and an anode, covered by bacteria populations. These biofilms act as biocatalysts which promote electrochemical reactions and enhance kinetics. This project will focus on the treatment of cheese whey and its valorization into biomethane.

Your tasks:

Responsible for the operation of the bio-electrolysis stack, you will be in charge of experimental procedures and developments. After activation of the reactor (inoculation with biocatalysts), you will test different stack configurations and study the effects of input parameters on the cells and stack outputs in order to optimize operating conditions.

More specifically, you will:

- 1) design, perform, and interpret bio-electrochemical tests;
- 2) Analyze gas samples and quantify their constituents (gas chromatographer, mass spectrometry);
- 3) Analyze and determine the COD, TOC, TC, and TN of liquid samples (e.g., cheese whey, wastewater);
- 4) Ensure the good hygiene and safety of yourself, others, and your lab space;
- 5) Report your results and findings in written and oral presentations.
- 6) A background in electrochemistry, environmental/biochemical engineering, and analytical chemistry is a plus.